

**Permanent Prices for Unbundled Network Elements**

**Service Charge**  
**CLEC Conversion**

**\$5.00**  
No Additional Charge  
other than  
Service Order

## Permanent Prices for Unbundled Network Elements

Rate Zone*	Tariffed Rate Group	Staff Proposed Price	NRCs	
			First	Additional
<b><u>Subloop Unbundling**</u></b>				
<b>8dB Feeder</b>				
Zone 1	Group D	\$4.81		
Zone 2	Group B	\$6.60		
Zone 3	Group A	\$6.87		
Zone 4	Group C	\$9.90		
	Statewide		\$22.88	\$10.55
<b>BRI Feeder</b>				
Zone 1	Group D	\$20.18		
Zone 2	Group B	\$32.17		
Zone 3	Group A	\$30.89		
Zone 4	Group C	\$39.13		
	Statewide		\$54.02	\$27.26
<b>DS1 Feeder</b>				
Zone 1	Group D	\$67.05		
Zone 2	Group B	\$67.27		
Zone 3	Group A	\$67.17		
Zone 4	Group C	\$70.79		
	Statewide		\$88.78	\$39.97
<b>8dB Distribution</b>				
Zone 1	Group D	\$6.69		
Zone 2	Group B	\$10.68		
Zone 3	Group A	\$12.92		
Zone 4	Group C	\$22.78		
	Statewide		\$113.44	\$47.28
<b>BRI Distribution</b>				
Zone 1	Group D	\$9.63		
Zone 2	Group B	\$13.63		
Zone 3	Group A	\$15.86		
Zone 4	Group C	\$25.70		
	Statewide		\$115.68	\$51.43
<b>DS1 Distribution</b>				
Zone 1	Group D	\$4.68		
Zone 2	Group B	\$6.23		
Zone 3	Group A	\$10.05		
Zone 4	Group C	\$22.41		
	Statewide		\$175.77	\$69.44

\* Staff proposed 4 rate zones corresponding to SWBT's tariffed rate groups while the Interim and SWBT proposed 3 rate zones by combining tariffed rates zones C and D into one zone.

\*\* The cost of concentration is included in both the feeder and distribution segments.

# **Missouri Public Service Commission**

## **Costing and Pricing Report**

In re AT&T's Petition for Arbitration to Establish an Interconnection Agreement with Southwestern Bell Telephone Co., Case No. TO-97-40.

In re MCI's Petition for Arbitration to Establish an Interconnection Agreement with Southwestern Bell Telephone Co., Case No. TO-97-67.

**Attachment C**

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## **REPORT OVERVIEW**

On December 11, 1996, the Commission issued the Arbitration Order for Case No. TO-97-40 - TO-97-67. Included in the Order was the establishment of interim rates for unbundled network elements and an interim resale discount. Subsequently, on January 22, 1997, the Commission issued an Order Granting and Clarification and Modification and Denying Motion to Identify and Motions for Rehearing establishing a procedure to set permanent prices for unbundled network elements and a discount rate for resale. The Commission designated a cost study team to review each parties' cost studies and models and make recommendations to the Commission based on its findings. Specifically, the Commission designated Dan Gordon, Matt Kohly, and Anthony Zerillo to review the cost studies and models. David Birenbaum of the Depreciation Department was assigned responsibility for depreciation issues. Ben Childers, Ph.D. provided assistance on the resale issue. Over a period of approximately four months, Arbitration Advisory Staff (Staff) investigated Southwestern Bell Telephone's (SWBT) Total Element Long Run Incremental Cost (TELRIC) studies and the Hatfield Cost Model sponsored by AT&T Communications of the Southwest Inc. (AT&T) and MCI Communications Inc. (MCI).

This report describes Staff's findings and proposed modifications. The report is divided into three main sections. Section I. Summary of Cost Review and Proposed Prices provides an overview of Staff's findings. Included are brief summaries of the focus of the cost review, the costing standard, and model selection. This section also identifies permanent prices that Staff proposes and a very brief summary of Staff's proposed modifications to SWBT's cost studies.

Section II. Unbundled Elements contains the review of SWBT's cost studies as well as a detailed description of Staff's proposed modifications and the rationale for making the modifications. Also in this section, is the detailed review of the Hatfield Model 3.1. The review of the model includes an analysis of the inputs and the structure of the model. Included in the review are the results from the Hatfield Model using inputs supplied by AT&T, SWBT, and Staff.

The final section is devoted to Resale. This section describes the proposed resale discount and the methodology used to calculate the discount.

## **SECTION I. SUMMARY OF COST REVIEW AND PROPOSED PRICES**

This section describes the focus of the cost review, the costing standard Staff proposes and the model selection process and result. This section also includes the prices for Unbundled Network Elements proposed by Staff and a brief summary of Staff's proposed modifications to SWBT's cost studies.

### **Focus of Cost Review**

The Commission's Arbitration Order contained interim prices as well as an interim resale discount. Those interim rates were based upon several sources including SWBT's Total Element Long Run Incremental Cost (TELRIC) studies, Modified SWBT TELRIC studies, Hatfield Model 2.2, and existing interstate rates. Between the time the Arbitration Order was issued and this cost review began, many of SWBT's TELRIC studies were modified and resubmitted to the Commission. Also in that time, the Hatfield Model 2.2 presented in the arbitration proceedings evolved into Hatfield Model 3.1. Because of these changes, the interim rates were no longer supported by some of the underlying studies and models. For this reason, Staff focused the review process on the studies and models submitted by the parties. Staff did not address any issues surrounding the interim prices.

### **Costing Standard**

A major point of contention between the parties is the issue of which costing standard to use. SWBT believes the appropriate costing standard to use is the historical, embedded network costs. However, SWBT did submit TELRIC studies it believed were forward-looking economic studies. These studies based costs upon the most current technology deployed in the existing network recognizing the existing network design and topography. No consideration was given the possibility that the existing network may be "over-built" or that the current layout was not the most efficient. Finally, no consideration was given to future demand or utilization levels.

AT&T and MCI propose using forward-looking economic costs incurred if one were to assume the network was completely rebuilt today. AT&T and MCI's cost standard would

assume a “scorched-earth” approach and design the network from the ground-up. Using this standard, the network design would definitely be different from that of the existing network. Done properly, this might be an appropriate costing standard. However, this standard, as calculated by the Hatfield Model does not consider the use of existing rights-of-way or physical limitations such as topography or the locations of existing infrastructure and buildings. Ignoring these factors will likely lead to understatement of the economic costs of the network.

Staff believes the most appropriate cost standard is the use of forward-looking economic costs assuming the existing network were being rebuilt today to meet forward-looking levels of demand. The approach includes the use of the latest technology currently deployed in the existing network. This approach also recognizes the use of existing rights-of-way and physical constraints that dictate how and where the network must be placed. Staff believes this costing standard will most closely resemble the costs that an efficient competitor would face if entering the market today. Finally, by recognizing forward-looking demand, this approach focuses the network design and cost recovery on the users of the network. Staff believes this more appropriately allocates the network costs to the cost-causer.

### **Model Selection**

During the cost review process, Staff analyzed both SWBT’s TELRIC studies and the Hatfield Model 3.1. After reviewing both models, Staff recommends the use of SWBT’s TELRIC studies with modifications as the basis for determining the cost of unbundled network elements.

The Hatfield Model makes a notable attempt at modeling the forward-looking economic costs of a telephone network. However, Staff has several concerns that suggest the Hatfield is not the correct cost-determining model for Missouri. These concerns are based on the Hatfield Model being a work in progress, weaknesses in the data, assumptions about Census Block Groups, how the network is built, assumptions about switching and wire centers, certain area specific variables that cannot be geographically deaveraged, and that the model does not account for growth. Finally, the Hatfield Model does not provide costs for items such as trunk ports and other unbundled network elements necessary to provide local services.

SWBT’s TELRIC cost studies with modifications are Missouri specific and more closely calculate the forward-looking economic costs incurred in SWBT territory. The studies use input pricing and labor cost data specific to Missouri. SWBT’s cost studies with modifications also produce prices for every element needed to provide local service. Utilizing SWBT’s TELRIC studies will allow the Commission to use one set of studies in setting interconnection rates rather than relying on several models or sources.

### **Staff Proposed Prices**

The table on the following pages contain Staff's proposed prices for UNE's. These proposed prices include both monthly recurring and non-recurring charges for the UNE's. Where appropriate, Staff has geographically deaveraged the monthly recurring rates into four zones to reflect the differences in costs.



## Proposed Pricing for Unbundled Network Elements

Rate Zone*	Tariffed Rate Group	Staff Proposed Price	First NRCs	Additional
<b><u>Unbundled Loops</u></b>				
<b>2-Wire 8 db Loop</b>				
Zone 1	Group D	\$12.71		
Zone 2	Group B	\$20.71		
Zone 3	Group A	\$33.29		
Zone 4	Group C	\$18.23		
	Statewide		\$26.07	\$11.09
<b>4-Wire 8 db Loop</b>				
Zone 1	Group D	\$19.79		
Zone 2	Group B	\$35.35		
Zone 3	Group A	\$61.16		
Zone 4	Group C	\$30.08		
	Statewide		\$28.77	\$11.09
<b>ISDN-BRI Loop</b>				
Zone 1	Group D	\$25.79		
Zone 2	Group B	\$42.10		
Zone 3	Group A	\$58.44		
Zone 4	Group C	\$41.44		
	Statewide		\$57.77	\$30.22
<b>ISDN-PRI Loop</b>				
Zone 1	Group D	\$101.18		
Zone 2	Group B	\$106.06		
Zone 3	Group A	\$107.89		
Zone 4	Group C	\$101.39		
	Statewide		\$136.63	\$53.94
<b>DS 1 Digital Loop</b>				
Zone 1	Group D	\$101.18		
Zone 2	Group B	\$106.06		
Zone 3	Group A	\$107.89		
Zone 4	Group C	\$101.39		
	Statewide		\$136.63	\$53.94
<b>dB Loop Loss Conditioning</b>		\$6.63	\$22.76	\$8.58
<b><u>Cross Connects</u></b>				
<b>Cross - Connects with Test Equipment, Same Central Office</b>				
2-Wire Analog		\$1.89	\$35.83	\$29.44
4-Wire Analog		\$3.77	\$41.63	\$35.73
2-Wire Digital ISDN-BRI		\$1.89	\$35.83	\$29.44
4-Wire Digital DS-1/ISDN-PRI		\$9.00	\$60.04	\$41.06
<b>Cross - Connects without Test Equipment, Same Central Office</b>				
2-Wire Analog		\$0.31	\$19.96	\$12.69
4-Wire Analog		\$0.63	\$25.38	\$17.73
2-Wire Digital ISDN-BRI		\$0.31	\$19.96	\$12.69
4-Wire Digital DS-1/ISDN-PRI		\$0.00	\$34.48	\$28.57
<b>Cross-Connects to Different CO or SWBT Multiplexor</b>				
2-Wire Analog		\$4.03	\$52.24	\$45.85
4-Wire Analog		\$5.19	\$60.47	\$54.57
2-Wire Digital ISDN-BRI		\$6.31	\$52.24	\$45.85

\* Staff proposed 4 rate zones corresponding to SWBT's tariffed rate groups while the Interim ar SWBT proposed 3 rate zones by combining tariffed rate zones C and D into one zone.

## Proposed Pricing for Unbundled Network Elements

Rate Zone*	Tariffed Rate Group	Staff Proposed Price	NRCs	
			First	Additional
<b><u>Local Switching Port Charges</u></b>				
<b>2-Wire Analog Line-Side Port</b>				
Zone 1	Group D	\$1.74		
Zone 2	Group B	\$1.97		
Zone 3	Group A	\$2.47		
Zone 4	Group C	\$2.25		
	Statewide		\$39.37	\$35.27
<b>ISDN-BRI Port</b>				
Zone 1	Group D	\$5.56		
Zone 2	Group B	\$5.56		
Zone 3	Group A	\$5.56		
Zone 4	Group C	\$5.56		
	Statewide		\$6.47	\$3.53
<b>ISDN-PRI Port</b>				
Zone 1	Group D	\$165.85		
Zone 2	Group B	\$165.85		
Zone 3	Group A	\$165.85		
Zone 4	Group C	\$165.85		
	Statewide		\$214.53	\$98.53
<b>DS-1 Trunk Port</b>				
Zone 1	Group D	\$132.14	\$162.38	\$24.76
Zone 2	Group B	\$126.71	\$162.44	\$24.83
Zone 3	Group A	\$58.04	\$160.47	\$22.86
Zone 4	Group C	\$140.35	\$164.98	\$27.36
<b>2-Wire Analog Trunk Port (DID)</b>				
Zone 1	Group D	\$13.55	\$64.00	
Zone 2	Group B	\$14.45	\$69.47	
Zone 3	Group A	\$10.60	\$59.76	
Zone 4	Group C	\$15.12	\$62.01	
<b><u>Usage - per Minute of Use</u></b>				
Zone 1	Group D	\$0.001988		
Zone 2	Group B	\$0.002391		
Zone 3	Group A	\$0.003444		
Zone 4	Group C	\$0.002934		
	Statewide		na	

\* Staff proposed 4 rate zones corresponding to SWBT's tariffed rate groups while the Interim and SWBT proposed 3 rate zones by combining tariffed rate zones C and D into one zone.

## Proposed Pricing for Unbundled Network Elements

Rate Zone*	Tariffed Rate Group	Staff Proposed Price	NRCs First	Additional
<b><u>Dedicated Interoffice Transport</u></b>				
<b>DS 1 Dedicated Transport I/O</b>				
<b>First Mile, per month</b>				
Zone 1	Group D	\$57.49	\$184.84	\$118.14
Zone 2	Group B	\$86.96	\$184.84	\$118.14
Zone 3	Group A	\$92.07	\$184.84	\$118.14
Zone 4	Group C	\$48.70	\$184.84	\$118.14
InterZone		\$100.36	\$184.84	\$118.14
<b>DS 1 Dedicated Transport I/O</b>				
<b>Additional Mile, per month</b>				
Zone 1	Group D	\$0.62	\$184.84	\$118.14
Zone 2	Group B	\$1.67	\$184.84	\$118.14
Zone 3	Group A	\$1.60	\$184.84	\$118.14
Zone 4	Group C	\$0.19	\$184.84	\$118.14
InterZone		\$0.97	\$184.84	\$118.14
<b>DS 3 Dedicated Transport I/O</b>				
<b>First Mile, per month</b>				
Zone 1	Group D	\$925.21	\$203.10	\$135.06
Zone 2	Group B	\$1,824.14	\$203.10	\$135.06
Zone 3	Group A	\$2,052.06	\$203.10	\$135.06
Zone 4	Group C	\$789.13	\$203.10	\$135.06
InterZone		\$2,361.66	\$203.10	\$135.06
<b>DS 3 Dedicated Transport I/O</b>				
<b>Additional Mile, per month</b>				
Zone 1	Group D	\$15.64	\$203.10	\$135.06
Zone 2	Group B	\$56.45	\$203.10	\$135.06
Zone 3	Group A	\$97.60	\$203.10	\$135.06
Zone 4	Group C	\$17.32	\$203.10	\$135.06
InterZone		\$25.87	\$203.10	\$135.06
<b>Transport Cross-Connects</b>				
DS 3		\$30.08	\$54.98	\$42.90

\* Staff proposed 4 rate zones corresponding to SWBT's tariffed rate groups while the Interim and SWBT proposed 3 rate zones by combining tariffed rate zones C and D into one zone.

\*\* The rate for an entrance facility should only apply when this element is actually utilized.

## Proposed Pricing for Unbundled Network Elements

	Staff Proposed Price	First	NRCs Additional
<b><u>Tandem Switching</u></b>			
per Minute Of Use	\$0.00151	na	na
<b><u>Signaling and Call Related Databases</u></b>			
Signal Transfer Point (STP) Port	\$480.61	\$217.14*	
SS7 Transport	\$0.0000007	na	na
Toll Free Calling Database Query			
Simple	\$0.000254	na	na
Complex	\$0.000288	na	na
Calling Name Delivery Query	\$0.000304	na	na
Line Information Database Query	\$0.000449	\$108.55	
<b><u>Dark Fiber</u></b>			
<b>Fiber Termination</b>			
Statewide	\$4.50	\$42.52	\$28.41
<b>Fiber, per strand, per mile</b>			
Zone 1           Group D	\$0.002085		
Zone 2           Group B	\$0.003156		
Zone 3           Group A	\$0.004752		
Zone 4           Group C	\$0.002085		
<b><u>Unbundled Common Transport</u></b>			
<b>Facility Cost per Minute, per Mile</b>			
Zone 1- Group D	\$0.000002	na	na
Zone 2 - Group B	\$0.000007		
Zone 3 - Group A	\$0.000015		
Zone 4 - Group C	\$0.000001		
InterZone	\$0.000003		
<b>Termination Cost Per Minute of Use</b>			
Zone 1- Group D	\$0.000190	na	na
Zone 2 - Group B	\$0.000285		
Zone 3 - Group A	\$0.000302		
Zone 4 - Group C	\$0.000162		
InterZone	\$0.000332		
<b><u>Directory Assistance and Operator Services</u></b>			
Directory Assistance	1	na	na
Directory Assistance Call Completion	1		
Directory Assistance Listing	1		
Local Operator Assistance	1		
IntraLATA Operator Assistance	1		
Operator Work Seconds	1		

1 Lowest Existing Intercompany Compensation Arrangement

\* Includes NRC for STP port termination, signaling point code, and global title translation.

**Proposed Pricing for Unbundled Network Elements**

**Service Charge**  
**CLEC Conversion**

**\$5.00**  
**No Additional Charge**  
**other than**  
**Service Order**

## Proposed Pricing for Unbundled Network Elements

Rate Zone*	Tariffed Rate Group	Staff Proposed Price	NRCs	
			First	Additional
<b>Subloop Unbundling**</b>				
<b>8dB Feeder</b>				
Zone 1	Group D	\$4.81		
Zone 2	Group B	\$6.60		
Zone 3	Group A	\$6.87		
Zone 4	Group C	\$9.90		
	Statewide		\$22.88	\$10.55
<b>BRI Feeder</b>				
Zone 1	Group D	\$20.18		
Zone 2	Group B	\$32.17		
Zone 3	Group A	\$30.89		
Zone 4	Group C	\$39.13		
	Statewide		\$54.02	\$27.26
<b>DS1 Feeder</b>				
Zone 1	Group D	\$67.05		
Zone 2	Group B	\$67.27		
Zone 3	Group A	\$67.17		
Zone 4	Group C	\$70.79		
	Statewide		\$88.78	\$39.97
<b>8dB Distribution</b>				
Zone 1	Group D	\$6.69		
Zone 2	Group B	\$10.68		
Zone 3	Group A	\$12.92		
Zone 4	Group C	\$22.78		
	Statewide		\$113.44	\$47.28
<b>BRI Distribution</b>				
Zone 1	Group D	\$9.63		
Zone 2	Group B	\$13.63		
Zone 3	Group A	\$15.86		
Zone 4	Group C	\$25.70		
	Statewide		\$115.68	\$51.43
<b>DS1 Distribution</b>				
Zone 1	Group D	\$4.68		
Zone 2	Group B	\$6.23		
Zone 3	Group A	\$10.05		
Zone 4	Group C	\$22.41		
	Statewide		\$175.77	\$69.44

\* Staff proposed 4 rate zones corresponding to SWBT's tariffed rate groups while the Interim and SWBT proposed 3 rate zones by combining tariffed rates zones C and D into one zone.

\*\* The cost of concentration is included in both the feeder and distribution segments.

## **Summary of Staff's Proposed Modifications to SWBT Cost Studies**

The following table summarizes each of the Staff's modification to SWBT cost studies. These modifications were made to calculate the Staff proposed prices for UNEs.

<b><u>Issue</u></b>	<b><u>Staff's Recommended Modifications</u></b>
<b>Modifications Affecting All Elements</b>	
Cost of Capital	Use 10.36%.
Depreciation	<p>Use the economic asset lives proposed by Staff. These economic lives are based predominantly upon bench-marking a composite of SWBT's proposed depreciation rates against implied depreciation rates of 19 likely competitors and other companies using similar technologies as SWBT. While the implied rates indicate a large range, SWBT's economic depreciation rates put SWBT sixth from the lowest in the pool of 19 benchmarked companies and 28 implied depreciation rates.</p> <p>Staff also recommends the use of MO-specific salvage values and the use of the Vintage Group (VG) method of depreciation recovery.</p>
Income Tax	Use of the effective rate without the Investment Tax Credit (ITC) Amortization - 38.36%. Staff believes this is the appropriate tax rate for a forward-looking firm. The ITC is no longer available and represents historic tax assessments.
Geographic Deaveraging	Use four rate zones instead of three. The four rate zones are based upon exchanges and match SWBT's existing rate groups. Staff believes this more closely reflects the geographic differences in costs.
Inflation Factors	Staff believes there is no justification to warrant the use of an inflation factor without also using a productivity factor. When the two are used together, they basically offset one another. Therefore Staff recommends that no inflation factor and no productivity factor be used.
Productivity Factor	Staff believes there is no justification to warrant the use of an inflation factor without also using a productivity factor. When the two are used together, they basically offset one another. Therefore Staff recommends that no inflation factor and no productivity factor be used.

<b><u>Issue</u></b>	<b><u>Staff's Recommended Modifications</u></b>
Building Factor	<p>Remove the CC/BC ratio from both the numerator and denominator to reflect the historic building and switching investment.</p> <p>SWBT's building factor was intended to be forward-looking. The use of the CC/BC ratio simply inflates the booked costs of the existing buildings and assumes exactly the number, size, and type of buildings would be put in exactly the same location.</p> <p>The FCC's use of existing wire centers was never intended to be a forward-looking assumption. A truly forward-looking building factor would have to recognize that fewer and smaller buildings would be used if the network were totally replaced. SWBT's building factor also fails to recognize the revenues for collocation and double recovers building investment. For these reasons, Staff recommends using the historic building investment in developing the cost factor.</p>
Building and Grounds Maintenance	<p>The investment used in developing this factor must be the historic building investment. This adjustment is made to be consistent with the modification to the building factor.</p>
<b><u>Loop Modifications</u></b>	
Distance Bands used in Loop Sample	<p>Eliminate distance bands or use the average length in each band. Staff believes this more accurately reflects the loop lengths in the sample.</p>
Loop Specific Samples	<p>Use a separate DS-1 sample for DS-1 loops, entrance facilities, and any other elements that uses a DS-1 loop. To be consistent, remove the DS-1 loops from the 8 db loop sample. Staff believes there are physical differences between 8 db loops and DS-1 loops. To reflect these differences, the sample needs to be specific to each type of loop.</p>



<b><u>Issue</u></b>	<b><u>Staff's Recommended Modifications</u></b>
Fill Factor	<p>Distribution - all zones use 40%.</p> <p>Feeder -  Rate Group A - 69.58%  Rate Group B - 77.90%  Rate Group C - 76.80%  Rate Group D - 75.70%</p> <p>Fiber Feeder, Feeder Stub, and DLC - all zones use 85%.</p> <p>There will be no additional fill on unused fiber feeder segments. Staff notes that SWBT never included a fiber strand fill factor in the loop cost studies.</p> <p>Staff believes the use of a forward-looking utilization level that is expected to occur over the life of the contract is most appropriate. Staff also believes the utilization levels need to reflect the shorter economic asset lives that SWBT will be using. Finally, Staff believes there is an inherent inconsistency in SWBT's proposal to utilize forward-looking loop characteristics and investment without the associated forward-looking utilization levels.</p>
Distribution to Code	SWBT's model should reflect a distribution to code that recognizes the forward-looking trend away from aerial feeder. The distribution to code used in the LPVST model should have 2% aerial feeder. This is based upon conversations with SWBT's network personnel.
Feeder Stub	Subtract the feeder stub from feeder for any loop over 15 kft. SWBT's treatment of the feeder stub results in a double recovery of its investment.
Pole and Conduit Sharing	Reflect 6.41% pole sharing and .09% conduit sharing. This is in addition to the approximately 45% of the poles SWBT shares with Union Electric that is already reflected in the pole investment.
Pole and Conduit Investment	Calculate investment outside the LPVST model. The method used in making this calculation will be similar to the method used in Texas with one exception. The number of poles will be calculated by dividing the Average Aerial Copper Span by the Average Pole Spacing. No additional rounding or inclusion of additional poles is allowed.
<b>Switching - Ports and MOU</b>	
Hardware Factor	Use a hardware factor that is specific to each type of switch. SWBT does not have any data to justify a hardware factors on AXE-10 and the DMS-10 so no hardware factors will be applied to these switches. Staff believes making the costs specific to each type of switch more accurately reflects the underlying costs.

<b><u>Issue</u></b>	<b><u>Staff's Recommended Modifications</u></b>
Minutes of Use	The minutes of use used in the switching cost studies must be forward-looking and reflect 10% growth per year. Staff believes this represents the utilization levels that will occur over the life of the contract. The 10% per year forecast is based upon historical data and conversations with SWBT network personnel.
Discounts	<p>Staff's proposed discounts apply only to materials.</p> <p>Staff believes these are conservative estimates of the discounts SWBT receives on switching. Staff's proposed discounts are based upon growth jobs which typically have less of a discount than new switch purchases.</p>
Analog Replacement	Replace analog switches with DMS-100 or 5ESS switches. Staff believes that simply removing analog switches from the study results in a biased sample.
Lines and Trunks	Use forward-looking line counts. Staff believes this represents the utilization levels that will occur over the life of the contract
Cost of Capital Used in Switching Studies	Use Staff's recommended 10.36% in all switching studies.
Tandem Double Counting	SWBT's local switching and tandem studies count Class 4/5 switches that serve as both end office and tandem switches in each study. This overstates the amount of investment. To correct this, multiply the ratio of local minutes divided by the total minutes by the getting started investment and SS7 investment for Class 4/5 switches used in the local switching studies. Eliminate the total tandem trunk CCS investments from the local switching studies. This methodology is based upon conversations with SWBT's Subject Matter Experts.
Weighting	Weight all switch port costs (except ISDN-BRI and ISDN-PRI) by the number of lines served by the switch. All switch types including AXE-10 and DMS-10 that use a particular port must be included in the cost. ISDN services are not included because, on a forward-looking basis, SWBT will provision these services with only one type of switch.
Intra office Calls Adjustment	SWBT's cost studies inappropriately counted Intra office minutes of use twice. To account for this, 9% of the total minutes of use should be removed.
Incomplete Calls	SWBT's cost studies do not include the cost for incomplete calls. No adjustment was recommended because sufficient data is not available.

**Issue****Staff's Recommended Modifications****Signaling**

STP Utilization    A link - 46.13125%  
                         C link - 12.9%  
                         D link - 40.47%  
                         SCP link - 18.76%  
                         800 DB Queries - 286  
                         LIDB queries - 30.25  
                         CNAM queries - 359.37  
                         10% port growth per year  
                         Factors can be rounded

Staff believes this forward-looking utilization is appropriate. This usage level recognizes the trend of increasing utilization and the implementation of local number portability (LNP) that will occur during this contract period. These usage levels are based upon conversations with SWBT's subject matter expert who does agree with these proposed usage levels.

**Interoffice  
Transport**

Interoffice            90% fiber strand fill  
Transport Fiber      High Speed Side electronics - 50%  
Fill                    Slow Speed Side electronics - 85%

Staff believes a fill of 90% would allow for the actual and near term use of the fiber, allow for a breakage factor (fibers that are unusable) and recognize that the investment in fiber can be recovered through the dark fiber rate element. Finally, unused or dark interoffice fiber can be used to provision different services. Staff feels it is not appropriate to assume it will be used for interoffice transport and allocate its costs to that rate element.

**Dark Fiber**

Dark Fiber Fill      Staff believes SWBT's use of a 60% fill factor is too low. This fill factor would recover 40% of the fiber investment without SWBT ever having to use the facilities or make them available to other carriers. Staff believes this fill factor would create little incentive for SWBT to make dark fiber available to other carriers.

Staff recommends a 95% fill factor for dark fiber strands. The 5% spare capacity will allow for breakage (unusable fiber). SWBT can recover the investment in dark fiber by leasing it to other carriers or through its own use.

Staff notes that the interoffice transport has a 90% fill factor on dark fiber. When the two are combined, SWBT has 15% of its unlit fiber reserved for breakage and near term use.

<b><u>Issue</u></b>	<b><u>Staff's Recommended Modifications</u></b>
Connectivity of Dark Fiber	Staff recommends that fiber termination charges be applied per termination rather than on a per mile basis. Fiber termination costs are not distance sensitive. Where possible, costs should be recovered in the manner in which they occur. Fiber termination costs are incurred each time a fiber cable is terminated. Therefore, the corresponding rate should apply per termination.
<b>Miscellaneous Modifications</b>	
In-Place Factors	All changes made to ACES must be made to in-place factors.
In-Place Factors	BRI, DS-1, and PRI must remove the power factor from the ACES run. SWBT's cost studies included this factor in two places, leading to a double recovery of investment.
<b>Non-Recurring Charges</b>	Service Order - \$5.00
	Simple Conversion - no charge other than the Service Order charge. CLEC must specify which UNE's it needs to provide service.
	All other NRC's should be half of those proposed by SWBT.
	Staff is concerned that the primary source of the cost data for the NRCs is based upon the opinion of Subject Matter Experts not on actual time and motion studies or cost information. Additionally Staff is concerned that these charges present significant barriers to entry for local competition.

## **SECTION II.**

### **UNBUNDLED NETWORK ELEMENTS**

This section presents Staff's findings and recommendations for SWBT's specific cost studies. For each cost study, its purpose, proposed recommendations, and a summary of the study is presented. The summary of the cost study presents a discussion of inputs, models used, and methodology for determining incremental investment. This section is divided into three sub-sections. The first address cost studies specific to a particular unbundled network element (UNE) or group of UNEs. The second section addresses the model, namely the ACES cost model, and the inputs that affect the costs for all UNEs. These include common costs, cost of capital, depreciation, income tax, inflation and productivity factors and geographic deaveraging. Also included in the section is an analysis of the non-recurring charges for Service Orders and for provisioning UNEs. Finally, the last subsection address the Hatfield Model.

## **Loop Cost Studies**

### **Purpose**

The purpose of this study is to identify the investment and the TELRIC associated with the local loop for a standard 8 db loop as well as Integrated Services Digital Network-Basic Rate Interface (ISDN-BRI), Digital Service-1 (DS-1), and Integrated Services Digital Network-Primary Rate Interface (ISDN-PRI) loops. The study utilizes the Loopvest model which calculates the cable, pole and conduit costs associated with each type of loop. The second part of the study identifies the cost associated with the feeder stub, feeder distribution interface (FDI), Digital Loop Carrier Equipment (DLC), network interface device (NID), drop, and other network components.

### **Concerns and Proposed Modifications**

The following section identifies the primary areas of concern with the study SWBT used to calculate the costs of each type of loop. Where possible, Staff recommends certain modifications to rectify or reduce problem areas. In the instances where a modification is not possible, Staff explains the concerns and attempts to estimate the impact or implications of the problem.

**Mid-Point Distance Used in Loop Sample** - The loop sample is divided into distance bands to capture the costs of different design standards for different loop lengths. SWBT was calculating the cost for each distance band using the mid-point of each band. Our analysis showed that the mid-point distance was statistically different from the average distance in the distance band. In total, the difference between the average and the mid-point led to a significant overstatement of the cable actually in the loop.

**DS-1 & ISDN-PRI Loop Sample** - SWBT uses the same loop sample drawn from all types of loop for calculating the cost of each type of loop. The predominant loop in the sample is an 8 db residential loop. Because of the dominance of the sample by one type of loop, the loop sample tended to reflect the characteristics of that type of loop. On average, an 8 db loop is longer than a DS-1 or an ISDN-PRI loop which causes the cost studies to overstate the length and cost of these two types of loops. That difference is substantial, especially in rural areas.

To resolve the problem, SWBT made the sample specific to each type of loop. To accomplish this, SWBT will remove the DS-1 and ISDN-PRI loops from the overall

sample. Since the DS-1 and ISDN-PRI loops are shorter, on average, removing them from the loop sample may increase the average sample length for 8 db loops. Because of the dominance of the 8 db loops, this increase should be minimal.

## **Fill Factors**

Fill Factors are applied to cable and DLC electronics used in the loop to recover the investment for unused capacity. SWBT proposed using their actual fill factors in the TELRIC studies. Staff believes the use of actual fill factors is not forward-looking and does not correspond to other forward-looking assumptions made by SWBT. The fill factors and the proposed modifications for each loop component that utilize fill factors are described below. Section I applies to all components using fill factors and the following subsections propose modifications and rationale for fill factors for specific loop components.

SWBT opposes the use of forward-looking fill factors. SWBT contends that its actual fills are the best representation of utilization in a rapidly changing competitive environment. Staff submitted multiple data requests asking SWBT to provide forward-looking fill factors or estimates of future usage. In each instance, SWBT responded that it did not have data to make a forward-looking usage projection.

I. All Fill Factors - One reason for proposing forward-looking fill factors is the use of economic depreciation rates. SWBT's current utilization levels are based upon a capital recovery period that is almost twice as long as the capital recovery period resulting from the use of economic depreciation rates. The following table compares the FCC Ordered asset lives to the Staff proposed economic lives for the major copper cable accounts which comprise the bulk of the loop. Clearly, the Staff proposed economic lives are much

Comparison of FCC Ordered Lives and Staff Proposed Economic Lives for Copper Cable Accounts			
Type of Copper Cable	SWBT Current Asset Lives (yr.)	Staff Proposed Economic Lives (yr.)	Difference
Aerial	26	13.7	- 47.3%
Underground	30	15	- 50.0%
Buried	25	16.3	- 34.8%

shorter than the lives SWBT currently operates under. It seems reasonable that a company would try to match the utilization of the network with its useful economic life. For this reason, increased fill factors that reflect a shorter capital recovery period should be used.

II. Distribution - SWBT utilizes the following fill factors for distribution:

Zone 1	**	_____	**
Zone 2	**	_____	**
Zone 3	**	_____	**
Total State	**	_____	**

SWBT's fill factors for each zone are the ratio of actual working lines to available lines. Because of the use of economic depreciation rates and trends in network utilization, Staff believes that utilization of SWBT's proposed fill factors is not appropriate.

One trend that Staff believes will greatly impact the fill factors in the distribution segment of the network is the increased utilization of second lines. When SWBT provides a second lines to a customer, SWBT does not physically build new facilities to the customer. Instead, one of the customer's allotted distribution pairs is used to provision the service. Therefore, if a customer orders a second line, this will have the effect of increasing fill in the distribution segment of the loop. Below is a table that identifies the percentage of households from 1988 to 1995 which have second lines:

**Additional Residential Lines For  
Households with Telephone Service<sup>1</sup>**

<u>Year</u>	<u>% Households with Second Lines</u>
1988	2.7
1989	3.0
1990	4.4
1991	7.3
1992	9.2
1993	9.5
1994	12.3
1995	14.7

As the table indicates, the number of second lines for residential customers is increasing. Staff believes this trend will have a significant impact on the fill factors used in the distribution portion of the network.

Finally, the Hatfield model utilizes a statewide average fill factor of 50.2%. Although Staff is not recommending the use of the Hatfield model, it is worth noting that the model's fill factors are higher than either of those proposed by SWBT or Staff.

Staff proposes a 40% fill factor for the distribution segment of the loop for all geographic zones. Staff believes that this is a conservative forward-looking estimate, as SWBT currently utilizes distribution fills as high as \*\* \_\_\_\_\_ \*\* (fill in geographic zone 1).

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<sup>1</sup> Federal Communications Commission, Trends in Telephone Service, March 1997.



**III. Copper Feeder** - SWBT utilizes the following fill factors for copper feeder:

Zone 1	**	_____	**
Zone 2	**	_____	**
Zone 3	**	_____	**
Total State	**	_____	**

Again, SWBT's copper feeder fill factors are based on actual working lines to available pairs. Because of the use of economic depreciation rates, Staff believes that utilization of SWBT's proposed fill factors is not appropriate. Additionally Staff believes that because of other forward-looking assumptions made by SWBT in the loop cost models, it is not appropriate to use SWBT's current utilization levels.

One of the forward-looking assumptions SWBT makes in its TELRIC loop studies is that there will be 100% Feeder Distribution Interface (FDI) placement. An FDI is simply a cross connect box located in the field, which allows any pair of distribution cables to be connected to any pair of feeder cables. SWBT's FDI assumption means that every loop will be provisioned with an FDI. From testimony of SWBT witness Bill Deere, it is known that approximately 60% of existing loops use an FDI.

SWBT's forward-looking assumption that all loops will be instantaneously provisioned with an FDI should also be accompanied by an assumption that feeder fill will increase. Because FDI's provide an additional cross connect point and increased flexibility, feeder fill will be higher for loops with an FDI than loops without an FDI. SWBT does not dispute that copper fill will increase with the addition of FDIs.

In light of the fact that feeder fill will undisputedly increase as a result of SWBT's 100% FDI placement, and because of the proposed asset lives which are much shorter than lives under which SWBT currently operates, Staff proposes the following fill factors for the copper feeder segment of the loop:

Zone 1	76.80%
Zone 2	77.90%
Zone 3	69.58%
Total State	75.70%

**IV. Fiber Feeder** - With regard to the fiber feeder segment of the loop, SWBT has proposed the same fill factors used in the DLC equipment which is \*\* \_\_\_\_\_ \*\*. Under SWBT's forward-looking assumptions, fiber and DLC technology will be used in the feeder segment of the loop whenever the loop is greater than 15,000 feet. These loops will be provisioned via DLC technology using fiber in the feeder segment of the loop, a copper feeder stub connecting the DLC remote terminal to the FDI, and copper facilities in the distribution segment of the loop.